C.1

MODEL 60-NA TYPE 2
VOLT-OHM-MILLIAMMETER

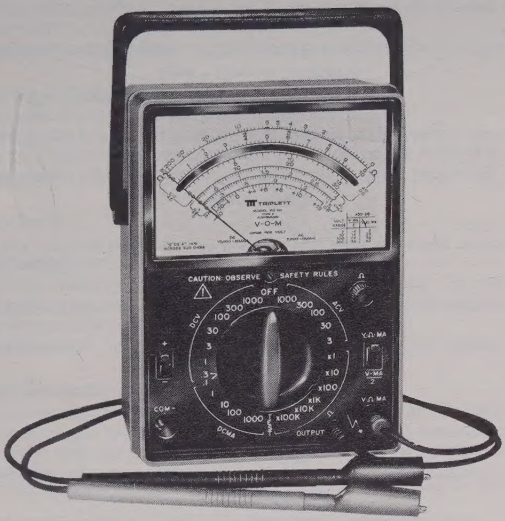
INSTRUCTION MANUAL

TRIPLETT
CORPORATION

MP MASTER

MA26280

MODEL 60-NA TYPE 2
VOLT-OHM-MILLIAMMETER



TRIPLETT CORPORATION

One Triplett Drive
Bluffton, Ohio 45817

SAFETY RULES

Warning

This tester has been designed with your safety in mind. However, no design can completely protect against incorrect use. Electrical circuits can be dangerous and/or lethal when lack of caution or poor safety practices are used.

Read The Manual

Read this Instruction Manual carefully and completely.

Voltages and currents within the capability of this test equipment can be hazardous. Follow the instructions in this manual for every measurement. Read and understand the general instructions before attempting to use this tester. Do not exceed the limits of the tester.

Safety Check

Double check the switch setting and lead connections before making measurements. Are you following all of the instructions?

Disconnect the tester or turn off the power before changing switch positions.

Do not connect to circuits with voltage present when switch is in any ohms or current position.

When replacing fuses use only specified type fuses and insert in correct fuse holder.

Don't Touch

Don't touch exposed wiring, connections or other "live" parts of an electrical circuit. If in doubt, check the circuit first for voltage before touching it.

Turn off the power to a circuit before connecting test probes to it. Be sure there is no voltage present before you touch the circuit.

Do not use cracked or broken test leads.

High Voltage Is Dangerous

Always start with the power off. Be sure there is no voltage present before making connections to the circuit.

Don't touch the tester, its test leads, or any part of the circuit while it is on.

Before disconnecting the tester, turn the circuit off and wait for the meter to return to "zero."

Distribution Circuits Pack A Punch

In high energy circuits such as distribution transformers and bus bars, dangerous arcs of explosive nature can occur if the circuit is shorted. If the tester is connected across a high energy circuit when set to a low resistance range, a current range, or any other low impedance range, the circuit is virtually shorted.

Special equipment designed for use with these circuits is available. Contact a qualified person for assistance before attempting to make measurements on any high energy circuit.

Safety Is No Accident

TABLE OF CONTENTS

Safety Rules 2

Specifications 4

Description 7

General Instructions 9

Measuring DC Volts 14

Measuring AC Volts 15

Measuring Output Voltage 16

Measuring Decibels (dB) 17

Measuring DC Current 18

Measuring Resistance 19

Accessories 20

Maintenance 22

Replaceable Parts 28

Schematic 30

Parts Location 31

Limited Warranty 32

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SPECIFICATIONS

DC Volts	
Ranges	0-.15, .3, .5, 1, 1.5, 3, 15, 30, 50, 100, 150, 300, 500, 1000 V
Accuracy	±1½ % of full scale reading Calibrated at 77°F (25°C)
Sensitivity	Approximately 20,000 ohms per volt on 0-.15, .5, 1.5, 15, 50, 150 and 500 V ranges Approximately 10,000 ohms per volt on 0-.3, 1, 3, 30, 100, 300, and 1000 V ranges
Maximum Input Voltage	1000 volts
AC Volts	
Ranges	0-1.5, 3, 15, 30, 50, 100, 150, 300, 500, 1000 V
Accuracy	±3% of full scale reading Calibrated at 77°F (25°C)
Sensitivity	Approximately 10,000 ohms per volt on 1.5, 15, 50, 150, and 500 V ranges Approximately 5,000 ohms per volt on 3, 30, 100, 300 and 1000 V ranges
Frequency Response	20 Hz to 20 kHz for 1.5 thru 300 V ranges
Rectifier	Average responding circuit calibrated to indicate RMS value of a pure sine wave.
Maximum Input Voltage	1000 VAC RMS, 1420 V peak

SPECIFICATIONS (Continued)

DC Current

Ranges	0-.05, .1, .5, 1, 5, 10, 50, 100, 500, 1000 mA
Accuracy	±1½% of full scale reading Calibrated at 77°F (25°C)
Voltage Burden	Approximately 158 mV on .05, .5, and 5 mA ranges Approximately 300 mV on 50 mA range Approximately 500 mV on 500 mA range Approximately 316 mV on .1, 1, and 10 mA ranges Approximately 600 mV on 100 mA range Approximately 1 V on 1000 mA range
Maximum Input Current	1 A

Resistance

Ranges	0-1kΩ, 10kΩ, 100kΩ, 1MΩ, 10MΩ, 100MΩ, (6Ω, 60Ω, 600Ω, 6kΩ, 60kΩ, and 600kΩ at center scale)
Accuracy	±1½% of scale length

	X1	X10	X100	X1K	X10K	X100K
Maximum Voltage - V	1.7	1.7	1.7	1.7	34	34
Maximum Current -mA	282	28.2	2.82	0.282	0.566	0.0566
Maximum Power Transfer to Load - mV	120	12	1.2	0.12	4.81	0.481

Some semiconductor devices can be damaged by the voltage and current available in the ohmmeter circuit. Compare ratings of semiconductor devices and ohmmeter specifications before making measurements.

SPECIFICATIONS (Continued)

Output Voltage	
Ranges	0-1.5, 3, 15, 30, 50, 100, 300, 500, 1000 V
Maximum Input Voltage	1000 VAC RMS, 1420 V peak
Decibels	
Ranges	—26 to +52 dBm
Reference Level	0 dBm is 1 mW on 600 Ω line (0.775 VAC)
General	
Meter	Taut Band, separate housing for easy replacement
Scale	4½ inch mirrored scale
Test Leads	One red and one black lead supplied, each 48 inches long. Two screw-on insulated alligator clips included.
Carrying Handle	Position indent provides inclined tester stand.
Overload Protection	Meter movement protected by a diode module. 1/8 Amp/250 Volt Fuse. 1 Amp/250 Volt Fuse. 2 Amp/1000 Volt Fuse, located inside tester.
Batteries	One 1.5 Volt "D" cell. One 30 Volt battery.
Weight	Approximately 2½ pounds.
Size	Approximately 3¼" x 5¼" x 7¼".

DESCRIPTION

The Triplett Model 60-NA Volt-Ohm-Milliammeter (VOM) is a multi-range instrument for general electrical and electronic trouble shooting and measurement. It has been especially designed to satisfy the need for a precision instrument which can stand up under rigorous hard usage of the industrial and maintenance environment and at the same time provide a degree of safety in its use heretofore unavailable with an instrument of this kind.

X'TRA RUGGED:

Unique design and selection of materials permits the instrument to withstand the normal accidents of dropping and rough handling which occur in hard day to day use. The Model 60-NA is warranted to withstand an accidental drop up to a five foot height with deviation from its stated accuracy not exceeding $\pm 4\%$. The warranty does not include mechanical parts being defaced (scratched, etc.) from a drop or normal usage.

OVERLOAD PROTECTED:

The instrument has been engineered for significant reduction in the need for maintenance by virtual elimination of parts burn out (other than fuses), and parts damage from severe mechanical abuse. Three fuses are employed for unusual protection to the instrument and safety for the user. The 1/8 Amp and 1 Amp instrument fuses are used for normal overload conditions. Spares for each are included in the instrument. Protection is provided for high energy fault currents beyond the capabilities of the instrument fuses up to the capacity of the 2 Amp/1000V (20kW) fuse.

SAFETY DESIGNED:

Unusual effort has gone into this instrument's design to provide the greatest possible safety to the user.

The Model 60-NA provides a specially engineered internal electrical system to prevent explosive arcs in high energy circuits up to the 2 Amp/1000V (20 kW) fuse capacity. Complete insulation of the instrument itself plus a new type test lead are additional safety features.

CONFIDENCE TEST:

A feature built into the instrument for periodic reassurance checks of its meter. While not intended as a comprehensive test of the instrument it does permit a high level of confidence in the instrument meter if the pointer indicates within the area of the test symbol.

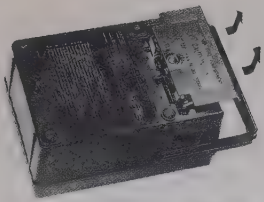
Ranges have been designed to cover nearly all applications with the added convenience of signal level measurements in decibel decade steps.

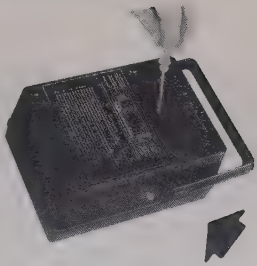
The carrying handle can be rotated to provide a stand for placing the instrument at a viewing angle of approximately 30 degrees

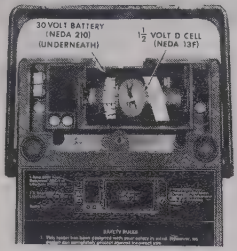
A separately sealed battery compartment permits access to batteries and fuses without removal of the remainder of the instrument. In addition, battery acids are sealed off to prevent damage to components.

GENERAL INSTRUCTIONS

INSTALL BATTERIES:

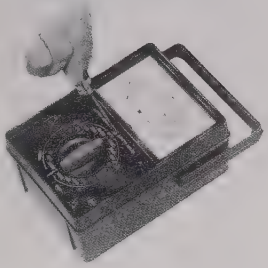






1. Loosen captive screw.
2. Slide cover off.
3. Install batteries.
4. Replace cover.

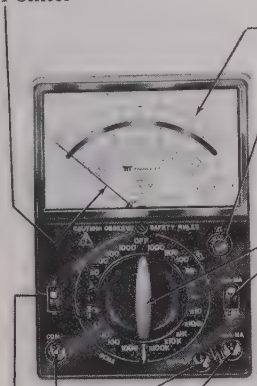
ADJUST POINTER TO ZERO:



With unit in operating position use a screwdriver to adjust pointer for a zero indication. While keeping the pointer on zero, reverse the rotation of the screw slightly to disengage it. This will reduce the affect of pointer shift under shock.

GENERAL INSTRUCTIONS (Continued)

USE OF CONTROLS



Pointer

Scales-see Page 11.

Ohms Adjust Control - sets full scale (0 ohms) indication on ohms ranges with test leads shorted.

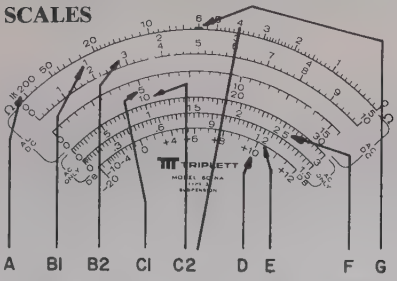
Range Switch - should be placed in OFF position when unit is not in use for best meter protection.

Divide Switch - when in the "VOM" position the range is the same as indicated by the range switch. When in the V-MA/2 position the range is half that indicated by the range switch.

Jacks - measurements are generally made with the test leads plugged into the COM - and V-Ω-MA jacks. Output voltage measurements require the test leads to be plugged into the COM - and OUTPUT jacks.

Polarity Switch - reverses the polarity of the entire VOM at the input jacks. This allows fast switching in case of wrong polarity; and also provides a convenient polarity reversal for ohms ranges, a very useful tool in semiconductor checking. When in the "+" position a positive voltage applied to the "V-Ω-MA" jack will cause an upscale pointer deflection. When in the "—" position the polarity is reversed.

USE OF SCALES



Range Switch Position	Divide Switch Position	Read Scale	Reading For Above Indication	Range Switch Position	Divide Switch Position	Read Scale	Reading For Above Indication
1000DCV	V-Ω-MA	B2	600VDC	X100K	V-Ω-MA	A	400kΩ
1000DCV	V-MA/2	B1	300VDC	X10K	V-Ω-MA	A	40kΩ
300DCV	V-Ω-MA	C2	190VDC	X1K	V-Ω-MA	A	4kΩ
300DCV	V-MA/2	C1	95VDC	X100	V-Ω-MA	A	400Ω
100DCV	V-Ω-MA	B2	60VDC	X10	V-Ω-MA	A	40Ω
100DCV	V-MA/2	B1	30VDC	X1	V-Ω-MA	A	4Ω
30DCV	V-ΩMA	C2	19VDC				
30DCV	V-MA/2	C1	9.5VDC	1000ACV	V-Ω-MA	B2	600VAC
3DCV	V-Ω-MA	C2	1.9VDC	1000ACV	V-MA/2	B1	300VAC
3DCV	V-MA/2	C1	0.95VDC	300ACV	V-Ω-MA	C2	190VAC
1DCV	V-Ω-MA	B2	0.6VDC	300ACV	V-Ω-MA	D	47.8dB
1DCV	V-MA/2	B1	0.3VDC	300ACV	V-MA/2	C1	95VAC
.3DCV	V-Ω-MA	C2	0.19VDC	300ACV	V-MA/2	D	41.8dB
.3DCV	V-MA/2	C1	0.095VDC	100ACV	V-Ω-MA	B2	60VAC
				100ACV	V-Ω-MA	D	37.8dB
1000DCMA	V-Ω-MA	B2	600mADC	100ACV	V-MA/2	B1	30VAC
1000DCMA	V-MA/2	B1	300mADC	100ACV	V-MA/2	D	31.8dB
100DCMA	V-Ω-MA	B2	60mADC	30ACV	V-Ω-MA	C2	19VAC
100DCMA	V-MA/2	B1	30mADC	30ACV	V-Ω-MA	D	27.8dB
10DCMA	V-Ω-MA	B2	6mADC	30ACV	V-MA/2	C1	9.5VAC
10DCMA	V-MA/2	B1	3mADC	30ACV	V-MA/2	D	21.8dB
1DCMA	V-Ω-MA	B2	0.6mADC	3ACV	V-Ω-MA	F	1.84VAC
1DCMA	V-MA/2	B1	0.3mADC	3ACV	V-Ω-MA	D	7.8db
.1DCMA	V-Ω-MA	B2	0.06mADC	3ACV	V-MA/2	E	0.96VAC
.1DCMA	V-MA/2	B1	0.03mADC	3ACV	V-MA/2	D	1.8db

Test V-ΩMA G Out of Tolerance

GENERAL INSTRUCTIONS (Continued)

• Readings on the sensitive voltage, current and resistance ranges may sometimes be different than calculated values. Thermo-electric or electro-chemical reaction can sometimes generate voltage (or current) in a circuit due to elevated temperatures from soldering, contact of dissimilar metals, chemical fumes or moisture. Also, fingers should never touch the metal parts of the test probes since body resistance can cause erroneous readings — particularly on the high ohmmeter ranges.

• Check the test leads periodically. Leads that are worn, have damaged insulation, damaged plugs, damaged probes, or loose parts should be replaced.

• The test probes should be disconnected from the voltage source (or the source shut off) before the range switch or polarity switch positions are changed. This practice will result in increased life and reliability for the VOM and increased safety for the user of the VOM.

• The insulated alligator clips provided with the VOM screw on the end of the test probes. When measuring high voltages, the use of these alligator clips will allow measurement without handling the test probes. As a safety measure, always shut off power source before attempting to connect alligator clips.

• When the approximate value of the quantity being measured is not known, always start on the highest range. For greatest accuracy, choose the range which will allow readings to be taken in the upper (right hand) portion of the scale.

• When an instrument has not been used for a long period of time operate all switches several times to wipe the contacts.

CAUTION: Always observe the following rules and procedures when making measurements in high voltage circuits:

1. Turn off equipment or other source of voltage, before connecting test probes. Make sure no capacitors in the circuit being tested remain charged to a high voltage.
2. Install alligator clips on test probes. While holding the insulated section of the test probe, check circuit to see if any voltage (or current) is present. If no voltage is present, connect the alligator clips to the circuit to be measured.
3. Turn on equipment, or voltage source, and take required readings. DO NOT handle or touch the VOM, test leads or test probes with power source turned on.

• The Triplett Model 60-NA has a mirror behind the dial to help eliminate parallax error. When reading the dial, line up the reflected image of the pointer directly behind the pointer. Then without moving your head, read the dial.

• When making current measurements, compensate for the voltage drop across the VOM in critical low voltage circuit measurements.

• When making voltage measurements in high impedance electronic circuits, the current drawn by the VOM can change operating voltages while it is connected. The specifications section of this manual gives the VOM impedance for all ranges to assist in analyzing loading effect on the circuit.

• The overload protection circuit in the meter movement can act as a rectifier in strong RF fields and cause erratic meter indications. Provide adequate shielding and filtering of the VOM and test leads to reduce this problem.

CONFIDENCE TEST

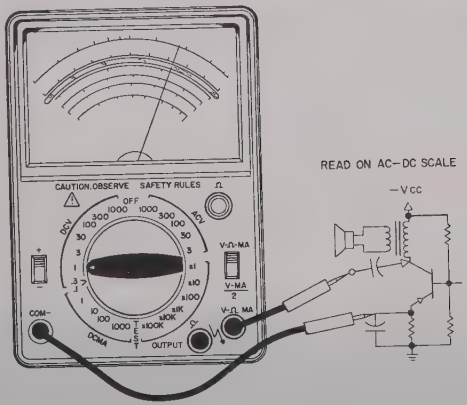
A "Confidence Test" feature has been built into the instrument to allow the user to make periodic reassurance checks of the meter. To make the test proceed as follows:

1. Check meter zero adjustment. Pointer should rest over the "zero" lines at left end of scale. See General Instructions for readjustment procedure.
2. Set divide switch to V-Ω-MA and polarity switch to + or —.
3. Set range switch to X100K position
4. Plug test leads into COM - and V-Ω-MA jacks and connect the tips of the leads together.
5. Adjust Ω control for "0" ohms indication.
6. Move range switch to TEST position without disconnecting leads or moving the Ω control. The pointer should indicate within the red block located at the middle of the scale (see "Use of Scales" in the General Instructions section of this manual).

MEASURING DC VOLTS

0-0.15 thru 0-1000 DC Volts:

1. Insert test leads in V-Ω-MA and COM - jacks.
2. Place selector switch in appropriate DCV position.
3. Set the divide switch to the appropriate position.
4. Check the setting of the polarity switch.
5. Connect the test probes across the voltage to be measured.
6. Read voltage on "AC-DC" scale.



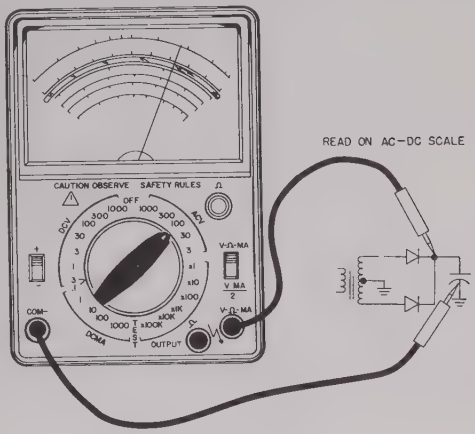
MEASURING AC VOLTS

0-1.5 and 0-3 AC Volts:

1. Insert leads in V-Ω-MA and COM - jacks.
2. Place selector switch in 3 ACV position.
3. Set the divide switch to the appropriate position.
4. Connect the test probes across the voltage to be measured.
5. Read voltage on the red 0-1.5 or 0-3 "AC" scale.

0-15 thru 0-1000 AC Volts:

1. Insert test leads in V-Ω-MA and COM - jacks.
2. Place selector switch in appropriate ACV position.
3. Set the divide switch to the appropriate position.
4. Connect the test probes across the voltage to be measured.
5. Read voltage on "AC-DC" scale.

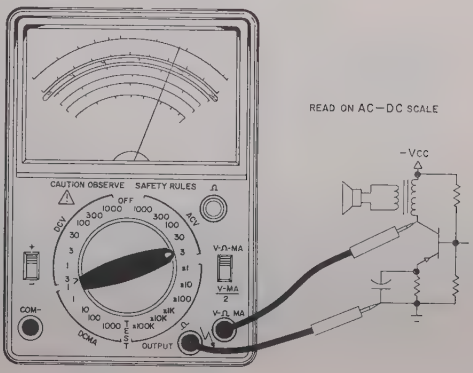


MEASURING OUTPUT VOLTAGE

Output voltage is the AC part of a combined AC and DC voltage. Such a voltage is usually found in amplifier circuits, but it may also be found in other circuits. To measure output voltage, the DC part of the combined voltage must be removed or "blocked." This is done by inserting a capacitor in series with the AC voltage section of the VOM. The VOM has a .1 μF 1000 VDC capacitor between the OUTPUT and V-Ω-MA jacks to do this.

1. Insert test leads into the OUTPUT and COM - jacks.
2. Follow steps 2 thru 5 for AC VOLTS (above).

The impedance of the capacitor is generally insignificant at audio frequencies. However, it may cause the meter to read low at low frequencies. Its effect should be considered in critical low frequency measurements.



MEASURING DECIBELS (dB)

The decibel is a unit that expresses the ratio of power levels. It is mathematically derived to reduce multiplication and division to addition and subtraction, respectively, (e.g. -10 dB represents multiplication by 10, 20 dB by 100, 30 dB by 1000). The decibel roughly approximates human hearing ratios. For this reason, it is commonly used in audio and telephone measurements.

Because the decibel represents a ratio, there is a reference level. The Model 60-NA reference level for 0 dBm is 1 milliwatt into a 600 ohm load (.775 ACV across 600 ohms). Measurements made across loads other than 600 ohms are relative measurements.

To measure decibels, connect the Model 60-NA the same as for measuring AC voltage (or OUTPUT voltage, if there is DC voltage present). But, read the dB scale instead of the voltage scales. A chart on the dial shows the dB values to be added to the reading for the different voltage ranges. (e.g. - when the selector switch is set to the 15 VAC position, and the multiplier switch to the "VOM" position, add 14 dB to the indicated value.) As explained above, addition of dB represents multiplication of power (or voltage).

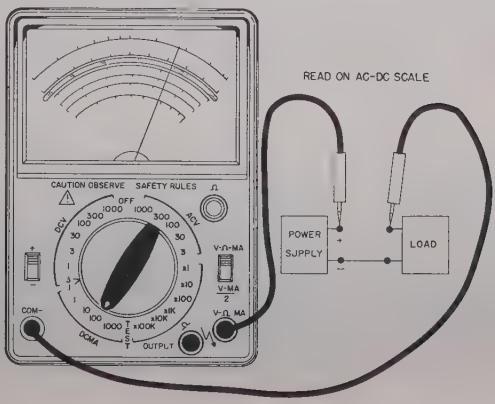
Voltage Range	Range Switch Position	Divide Switch Position	Decibel Range	Add or Subtract
1.5 ACV	3ACV	V-MA/2	—26 to +6	subtract 6 dB
3 ACV	3 ACV	V-Ω-A	—20 to +12	read as is
15 ACV	30 ACV	V-MA/2	—6 to +26	add 14 dB
30 ACV	30 ACV	V-Ω-A	0 to +32	add 20 dB
50 ACV	100ACV	V-MA/2	+4 to +36	add 24 dB
100 ACV	100 ACV	V-Ω-A	+10 to +42	add 30 dB
150 ACV	300 ACV	V-MA/2	+14 to +46	add 34 dB
300 ACV	300 ACV	V-Ω-A	+20 to +52	add 40 dB

MEASURING DC CURRENT

0-.05 mA thru 0-1000 mA:

1. Insert test leads in V-Ω-A and COM - jacks.
2. Place selector switch in appropriate position.
3. Set the divide switch to the appropriate position.
4. Check the setting of the polarity switch.
5. Connect the test probes in series with the circuit (use alligator clips).
6. Read current on "AC-DC" scale.

In most cases, the voltage drop across the VOM on current ranges will not affect the circuit being measured. However, in some low voltage circuits it may be necessary to compensate the circuit for the added voltage drop.



MEASURING RESISTANCE

X1 thru X100K Ohms Ranges:

1. Set range selector switch to desired (Ω) range.
2. Plug the test leads into the jacks. Short test prods and adjust the "Ω" control to set the pointer over the right (0 ohms) end of the red "Ω" scale.
3. Turn off all power to the circuit to be measured and/or disconnect one end of component being checked. Connect test leads across the circuit or part.

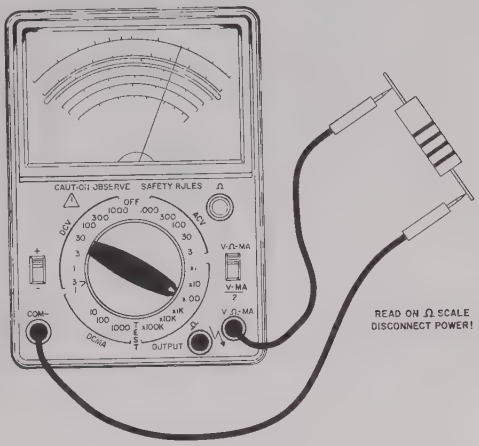
   OBSERVE ALL SAFETY PRECAUTIONS.
4. Read resistance on the "Ω" scale. Multiply the indication by the range multiplier (e.g. - multiply by 10 on the X10 range, 10,000 on the 10k range).

Continuity Testing:

Use the X1k resistance range. The lower battery drain will give longer battery life.

Polarity Switch:

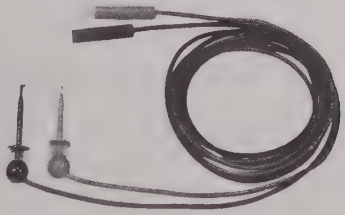
The polarity switch reverses the polarity of the jacks. This feature can be used for checking semiconductors. The V-Ω-mA jack is connected to the positive battery terminal with the polarity switch in the "+" position.



ACCESSORIES

The usefulness and range of the VOM can be extended by the use of the following accessories:

Miniature Clip For High Density Circuits



Part No.
79-373

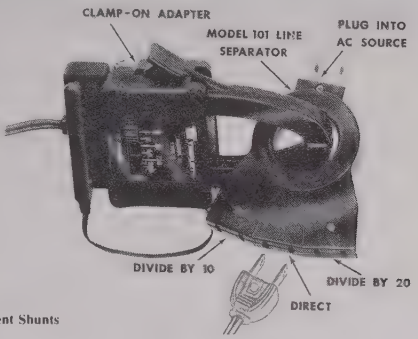
Leather Case

Part No.
10-2739

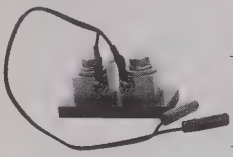
AC Current Measuring Accessories

AC line loads can be checked easily, without breaking the conductors or insulation of the circuit under test, when the Model 10 CLAMP-ON AMMETER ADAPTER (Cat No. 60-211) is used. The Adapter is connected with a No. 611 LEAD ASSEMBLY (Part No. 79-417). The lever on the side of the Model 10 Adapter is pressed to open the split yoke of the adapter so it can be placed over and closed around the lead or bus bar carrying the current being measured. Readings up to 300 AC amperes can be made.

THE MODEL 101 LINE SEPARATOR (Cat. 60-218) is used to divide a circuit using two-conductor cable so one conductor can be encircled by the adapter yoke. The Model 101 is plugged into the AC outlet and the AC cord of the equipment to be measured is plugged into the appropriate socket on the Model 101. The split yoke of the Model 10 Adapter is clipped through the loop in the Model 101 to make the current measurement. Use of the "Divide by 10" and "Divide by 20" sockets on the Model 101 Line Separator makes a convenient and fast method of measuring extremely low AC current.



DC Current Shunts



Part No.	To Read	Set Switches Range	Divide	Read On Scale	Multiply By
91-628	15 Amp	1DC MA	V-MA/2	0-15DC	Direct
	30 Amp	1DC MA	V-2 MA	0-30DC	Direct
91-629	50 Amp	1DC MA	V-MA/2	0-5 DC	x 10
	100 Amp	1DC MA	V-2 MA	0-10DC	x10

MAINTENANCE

DISCONNECT TEST LEADS FROM EXTERNAL CIRCUIT BEFORE SERVICING TESTER

BATTERY TEST AND REPLACEMENT

Two batteries are used in the ohmmeter circuit. A 1.5V D cell (NEDA 13F) is used for the X1, X10, X100 and X1K ranges. If the pointer cannot be adjusted to zero on any of these ranges, with the test prods touched together, the 1.5 volt battery should be replaced.

A 30V (NEDA 210) battery is used on the X10K and X100K ranges. If the pointer cannot be adjusted to zero on these ranges the 30 volt battery should be replaced.

See General Instructions for battery replacement procedure.

Calibration

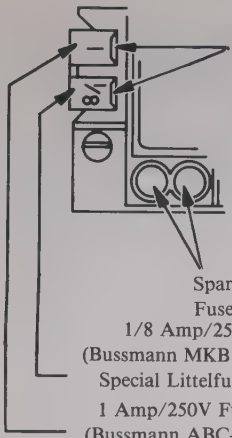
With normal use, readjustment of this VOM should not be necessary. An occasional check of the VOM against a known reference voltage or another VOM is good practice. If there is a question about the accuracy of the VOM, it should be returned to the factory or an authorized service center for a calibration check.

Cleaning Plastic Window

The plastic window has been treated at the factory to dissipate static charges. If cleaning is required, use cotton dipped in a solution of common household detergent and water. After cleaning, allow the solution to dry without rubbing.

MAINTENANCE (Continued)

To replace 1/8 Amp or 1 Amp fuse:



1. Remove battery compartment cover (see General Instructions Page 9).

2. Slide clip towards edge of case until the fuse releases. Pull fuse out.

3. Holding clip towards edge, insert replacement fuse.

4. Press fuse down until clip springs back over fuse (use probe to assist, if desired).

5. Replace battery compartment cover.

Fuse Replacement

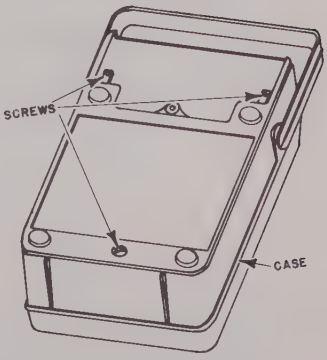
Three fuses are included, two of which are accessible by removing the battery compartment cover and the third, which is a 2 Amp, 1000 volt fuse intended to blow only if the primary fuses are over is accessible by removing the back cover.

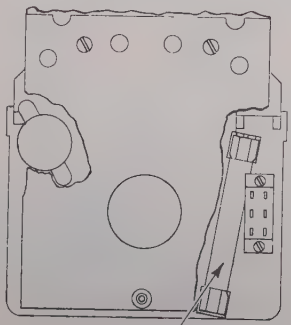
CAUTION: USE ONLY SPECIFIED TYPE FUSES AND INSERT IN CORRECT FUSE HOLDER

To replace 2 Amp (1000V) fuse:

1. Remove battery compartment cover (see General Instructions page 8).

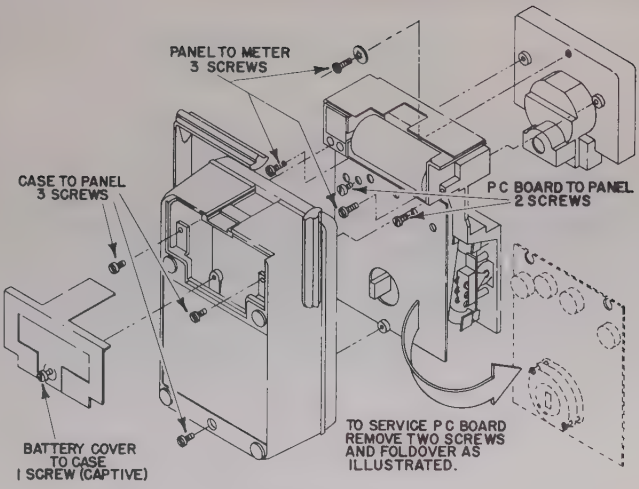
2. Remove three screws containing case. Remove case.





3. Locate fuse, remove and replace.

4. Replace case and battery cover.



Disassembly Instructions

Parts Replacement

Parts available for replacement are listed in the parts list. When replacing any parts, be careful to not disturb or damage any others. Do not overheat resistors or diodes, but be sure to make a good solder connection.

If there is evidence of smoke or an electrical arc inside the VOM, return the VOM to the factory or an authorized service center. There is a chance of hidden damage that could cause another failure in the VOM.

Repair or Service

For repair of the VOM, return it to the factory or an authorized service center. To help in repairing the VOM, give a detailed description of the problem and any other data that might be helpful such as what kind of circuit was being measured when the problem was discovered.

CALIBRATION

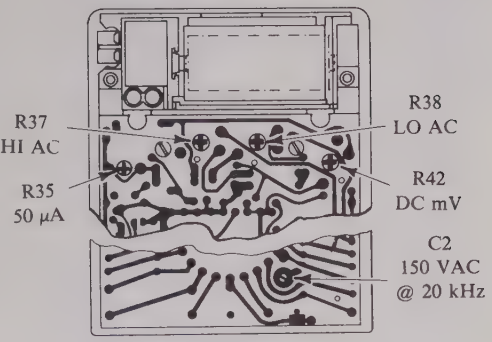
Should calibration be necessary voltage and current sources of .2% or better accuracy should be used and the sequence listed below should be followed.

1. MECHANICAL ZERO
   - A. Adjust pointer to zero (see General Instructions Page 9).
2. 50 MICRO-AMPERE CALIBRATION
   - A. Set function switch to 0.3 DCV position.
   - B. Set polarity switch to "+", and divide switch to V-MA/2 position.
   - C. Connect test leads to a 50 μA source.
   - D. Adjust R35 for full scale on the 0-5 scale.
3. DCmV CALIBRATION
   - A. Set function switch to 0.3 DCV position.
   - B. Set polarity switch to "+", and divide switch to V-MA/2 position.
   - C. Connect test leads to a 158 mV source.
   - D. Adjust R42 for full scale on the 0-10 scale.
4. REPEAT STEPS 2 AND 3
   - A. Re-adjust R35 and R42 if necessary to compensate for interaction of the two controls.
5. LOW AC VOLTS CALIBRATION
   - A. Set function switch to 3 ACV range.
   - B. Set polarity switch to "+", and divide switch to V-MA/2 position.
   - C. Connect test leads to a 1.5 ACV source.
   - D. Adjust R38 to full scale on the red 1.5 "AC only" scale.
6. HIGH AC VOLTS CALIBRATION
   - A. Set function switch to 300 ACV range.
   - B. Set polarity switch to "+", and divide to V-MA/2 position.
   - C. Connect test leads to a 158 ACV source.
   - D. Adjust R37 to full scale on the 0-10 scale.

7. REPEAT STEPS 5 AND 6, IF NECESSARY

8. FREQ. RESPONSE CALIBRATION
   A. Set function switch to 300 ACV position with the divide switch in V-MA/2 position.
   B. Connect test leads to a 150 ACV, 20 kHz source, and adjust trimmer C2 (mounted on P.C. board) to full scale on the black 0-15 "AC-DC" scale.

9. CHECK ALL RANGES FOR ACCURACY
   A. With appropriate voltage, current and ohms standards check all ranges.



Calibration Controls
Accessible From Top of PCB

REPLACEABLE PARTS

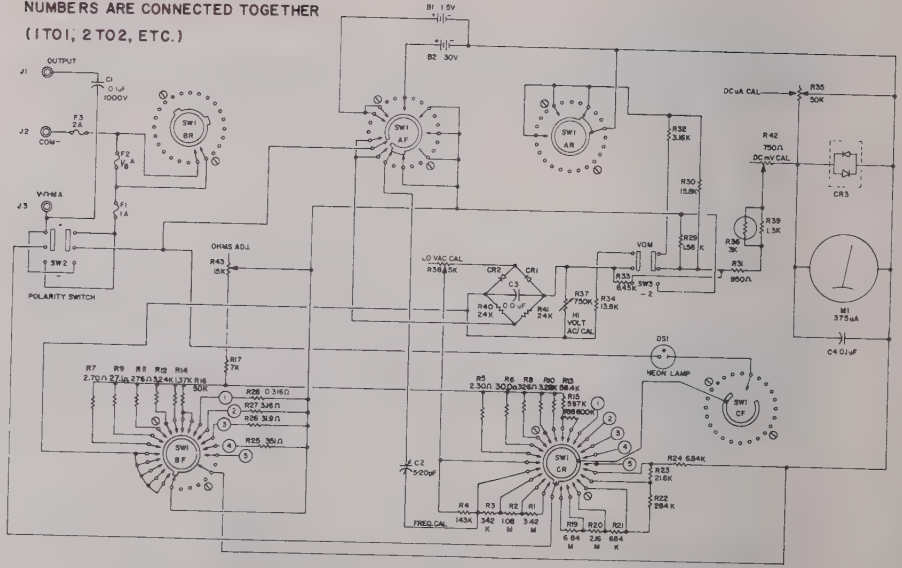
Circuit Symbol	Description	Part Number
B1	Battery 1.5V (NEDA 13F)	2426-1
B2	Battery 30V (NEDA 210)	37-19
C1	Capacitor .1μF 1000V	43-349
C2	Capacitor 5-20pF	43-470
C3	Capacitor .01μF	43-363
C4	Capacitor .1μF 100V	43-445
CR1, CR2	Diode*	11056
CR3	Diode	11670
DS1	Lamp, Neon	67-98
F1	Fuse 1 Amp/250V (Bussmann ABC-1, Littelfuse 314001 3AB)	3207-58
F2	Fuse 1/8 Amp/250V (Bussmann MKB 1/8, Triplett Special Littelfuse 360.110)	3207-45
F3	Fuse 2 Amp/1000V (Bussmann HVA-2, Littelfuse 621002)	3207-60
M1	Meter Assembly	52-7477
R1	Resistor 3.42 Meg	15K-3424PD7
R2	Resistor 1.08 Meg	15K-1084UC5
R3	Resistor 342k	15K-3423UC5
R4	Resistor 143k	15K-1433UC5
R5	Resistor 2.3Ω	15-5648
R6	Resistor 30.0Ω	15-5646
R7	Resistor 2.7Ω	15-5647
R8	Resistor 326Ω	15-5649
R9	Resistor 27.1Ω	15-5650
R10	Resistor 3.28k	15k-3281UC5
R11	Resistor 276Ω	15-5651
R12	Resistor 3.24k	15K-3241UC5
R13	Resistor 58.4k	15K-5842UC5
R14	Resistor 1.37k	15K-1371UC5
R15	Resistor 597k	15K-5973UC5
R16	Resistor 50k	15K-5002UC5
R17	Resistor 7k	15K-7001UC5
R18	Resistor 600k	15K-6003UC5
R19	Resistor 6.84 Meg	15K-6844PD7
R20	Resistor 2.16 Meg	15K-2164UD7

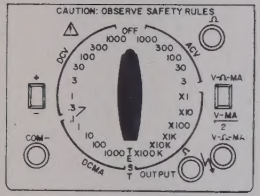
*If CR1 or CR2 is replaced, recalibration of AC Volts is required.

REPLACEABLE PARTS (Continued)

Circuit Symbol	Description	Part Number
R21	Resistor 684k	15K-6843UC5
R22	Resistor 284k	15K-2843UC5
R23	Resistor 21.6k	15K-2162UC5
R24	Resistor 6.84k	15K-6841TC5
R25	Resistor 351Ω	15-5768
R26	Resistor 31.9Ω	15-5781
R27	Resistor 3.16Ω	15-5624
R28	Resistor .316Ω	15-5625
R29	Resistor 1.58k	15K-1581UC5
R30	Resistor 15.8k	15K-1582UC5
R31	Resistor 950Ω	15K-9500UC5
R32	Resistor 3.16k	15K-3161UC5
R33	Resistor 8.45k	15K-8451UC5
R34	Resistor 13.8k	15K-1382UC5
R35	Resistor Variable 50k	16-277
R36	Thermistor 3k	15-2468
R37	Resistor Variable 750k	16-311
R38	Resistor Variable 5k	16-193
R39	Resistor 1.3k	15K-1301TC5
R40, R41	Resistor 24k	15K-2402TC5
R42	Resistor Variable 750Ω	16-286
R43	Resistor Variable 15k	16-292
SW1	Switch, Rotary	22-725
SW2	Polarity Reversal Switch	22-661
SW3	Divide Switch	22-661
	Meter Front w/Window	10-2733
	PC Board w/Components	87-511
	Shaft for Switch, Rotary	61-210
	Mainframe/Battery Compartment Assy.	28-1216
	Printed Panel w/Hardware	28-1217
	Knob, Rotary Switch	34-167
	Knob, Ω	34-164
	Battery Terminal, 1½V, 30V	46-156
	Fuse Clip	2451-122
	Fuse Clip Back-up Spring	42-289
	Coil Spring, Fuse	42-278
	Case Assembly w/Handle	10-2815
	Handle w/Hardware	3206-59
	Battery Compartment Cover	10-2817
	Test Leads	79-374

CIRCLED POINTS WITH THE SAME NUMBERS ARE CONNECTED TOGETHER (1TO1, 2TO2, ETC.)





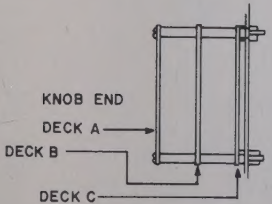
DECKS VIEWED FROM KNOB END OF SWITCH.

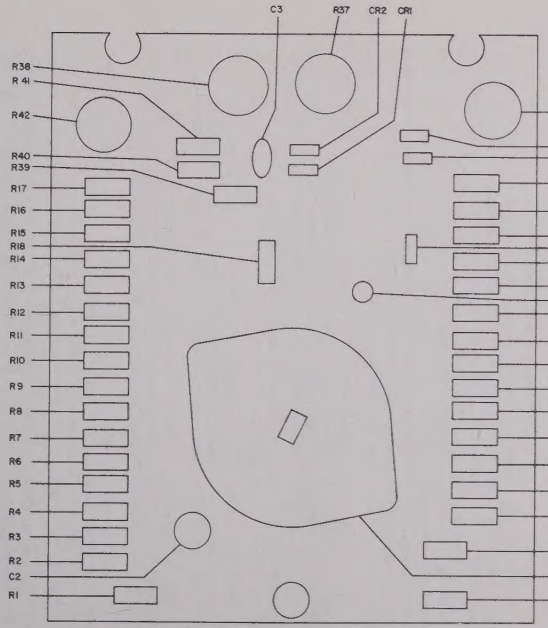
- POSITION NO. 1.

ROTARY SWITCH SHOWN IN OFF POSITION.

POLARITY SWITCH SHOWN IN + POSITION.

V.O.M ÷ 2 SWITCH SHOWN IN V.O.M POSITION.





Part Locations (Circuit Board)

LIMITED WARRANTY

The Triplett Corporation warrants instruments and test equipment manufactured by it to be free from defective material or factory workmanship and agrees to repair or replace such products which, under normal use and service, disclose the defect to be the fault of our manufacturing, with no charge for parts and service. If we are unable to repair or replace the product, we will make a refund of the purchase price. Consult the Instruction Manual for instructions regarding the proper use and servicing of instruments and test equipment. Our obligation under this warranty is limited to repairing, replacing or making refund on any instrument or test equipment which proves to be defective within three years (one year guaranteed calibration) from the date of original purchase.

This warranty does not apply to any of our products which have been repaired or altered by unauthorized persons in any way so as, in our sole judgment, to injure their stability or reliability, or which have been subject to misuse, abuse, misapplication, negligence or accident or which have had the serial numbers altered, defaced, or removed. Accessories, including batteries and fuses, not of our manufacture used with this product are not covered by this warranty.

To register a claim under the provisions of this warranty, return the instrument or test equipment to Triplett Corporation, Bluffton, Ohio 45817, transportation prepaid. Upon our inspection of the product, we will advise you as to the disposition of your claim.

ALL WARRANTIES IMPLIED BY LAW ARE HEREBY LIMITED TO A PERIOD OF THREE YEARS, AND THE PROVISIONS OF THE WARRANTY ARE EXPRESSLY IN LIEU OF ANY OTHER WARRANTIES EXPRESSED OR IMPLIED.

The purchaser agrees to assume all liability for any damages and bodily injury which may result from the use or misuse of the product by the purchaser, his employees, or others, and the remedies provided for in this warranty are expressly in lieu of any other liability Triplett Corporation may have, including incidental or consequential damages.

Some states (USA only) do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. No representative of Triplett Corporation or any other person is authorized to extend the liability of Triplett Corporation in connection with the sale of its products beyond the terms hereof.

Triplett Corporation reserves the right to discontinue models at any time, or change specifications, price or design, without notice and without incurring any obligation.

This warranty gives you specific legal rights, and you may have other rights which vary from state to state.

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